

REMARKS

Claims 1-3, 5-18, 20-27, 29-30 and 45-46 are pending in the application.

Claims 1 and 46 are amended above to more clearly distinguish the claimed invention from the cited prior art.

No new matter has been added to the application by way of these specification and claim amendments.

I. INTERVIEW SUMMARY

The Applicant thanks the examiner David Parsley for holding a telephonic interview on May 11, 2010 with A. Blair Hughes to discuss proposals for amending application claim 1 to distinguish it from the cited prior art. No agreement regarding ultimate claim patentability was reached during the interview. However, the examiner did indicate that the Applicant's proposed amendment to claim 1 would overcome the examiner's current claim rejection.

II. THE OBVIOUSNESS REJECTION TRAVERSE

Claims 1-3, 13, 19-27 and 29-30 stand rejected for being anticipated by U.S. Patent No. 4,766,813 to Winter et al. in view of Nielson et al. (USPA 2004/0020397) or alternatively in view of Jacoby et al. (USPA 2002/0017214). Claims 5-12 and 45 stand rejected for obviousness over the same three references and further in view of Collins et al. (USP 6,371,219). The examiner's obviousness rejections are traversed or they are overcome as set forth below.

A. Amended Independent Claims 1 Is Patentable Over The Cited Art

Independent claim 1 is non-obvious and patentable over the cited prior art for several reasons. Firstly, claim 1 is directed to a liner made from a single composition that includes a combination of metals – the at least two reactive metals and an inert metal. All metals are part of the same claimed liner “composition”. (E.g., International Application at p. 9, lns 9-25). Secondly, independent claim 1 is amended to indicate that it is a property of the liner that the at least two reactive metals participate in an intermetallic alloying reaction. (E.g., International Application at p. 4, lns 16-32; p. 6, lns 8-18). Thirdly, independent claim 1 is amended to require that the composition be a “green compacted” composition. Each of these amendments causes the inventions of independent claim 1 et al. to be patentable over the cited combination of references. (E.g., International Application at p. 7, lns 12-19; p. 13, lns 10-15).

In rejecting claim 1, the examiner relied upon Winter for disclosing the claimed liner including the at least two reactive metals and the inert metal. However, Winter discloses a two layer liner with one layer being a wrought metal alloy layer and the second layer being a deposited metal layer. Therefore, in Winter, not only are the metals not particulate materials, the three metals are not combined in the same composition. It is apparent from the language of claim 1 that the invention is directed to a single liner “composition” including all three metals and that the liner composition is “formed from a powder mixture” of the at least two metal elements and a third inert metal. For at least this reason, claims 1-3, 5-18, 20-27, 29-30 and 45 are patentable of the cited combination of references.

As mentioned above, the Winter liner layers are either alloy layers or single metal layers. None of the Winter liner layers include metal elements that “will undergo an intermetallic alloying reaction” as the amended claims require. Instead, the Winter liner layer that is a metal alloy layer includes metals that have already undergone an alloying reaction. For this reason as well, claims 1-3, 5-18, 20-27, 29-30 and 45 are non-obvious and patentable.

Finally, the examiner relies upon Nielson and Jacoby for disclosing shaped charge liners made from a compacted particulate composition of two metals. The Applicant has emphasized in previous Office Action responses that Jacoby is not related to the claimed invention because it does not disclose or suggest reactive metal liners. In other words, one skilled in the art at the time of the invention would understand Jacoby to disclose inert liners, that is, liners made of pressed particles of metals that are intended to be non-reactive with one another.

Although Nielson does relate to reactive liners, it is concerned with “Low Temperature, Extrudable, High Density Reactive Materials” for use in penetrating warheads and is not concerned with oil and gas well shaped charge perforators according to the present invention. Moreover, instead of an alloying exothermic reaction, the Nielson liner relies upon an oxidizing reaction as the main exothermic event and so requires, as an essential component, large amounts of a low melting temperature or ketone soluble fluoroelastomer or fluoropolymer as the oxidizing agent which is combined with the reactive particles and thereafter requires special processing steps. (See e.g. Nielson at para. [0032 & 0033]). By contrast, the present invention merely needs the composition to be “green” compacted (i.e. pressing intimately mixed powders in a die set as discussed in the specification at p. 13, lines 10-15), and that feature has been added to Claim 1 so as further to distinguish the claimed liner from the Nielson liner.

For all these reasons, claims 1-3, 5-18, 20-27, 29-30 and 45 are non-obvious and patentable over the cited prior art.

B. Claim 46 Is Non-Obvious And Patentable

Independent claim 46 is amended above in a manner similar to claim 1 to include the feature whereby the liner includes at least two reactive metals that “will undergo an intermetallic alloying reaction . . .”. Claim 46 is also amended to include the feature whereby the liner is “green compacted”. These newly added features at least cause claim 46 to be non-obvious over the prior art cited by the examiner for at least the reasons recited in Section II(A) above with respect to similar features added to independent claim 1.

CONCLUSION

All pending application claims are believed to be patentable for at least the reasons recited above. Favorable reconsideration and allowance of all pending claims is, therefore, courteously solicited.

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